## REMARKS

This Amendment is filed in response to the Office Action dated April 8, 2004. All objections and rejections are respectfully traversed.

Claims 1-54 are in the case.

Claims 23-54 were added to better claim the invention.

The Specification has been amended to insert a serial number in place of the attorney docket number. No new matter has been entered, and the Specification is believed to be in allowable condition.

At paragraph 1 of the Office Action, claims 1-6 and 8-9 were rejected under 35 U.S.C. §102(b) as being unpatentable in view of Lubbers et al., U.S. Patent No. 5,390,327 issued on February 14, 1995, hereinafter Lubbers.

The present invention, as set forth in representative claim 1, comprises in part:

A method for enabling parity declustering in a balanced parity array of a storage system, the method comprising the steps of:

*combining a plurality of unbalanced stripe arrays to form the balanced array*, each unbalanced stripe array having parity blocks on a set of storage devices that are disjoint from a set of storage devices storing data blocks; and

*distributing assignment of storage devices to parity groups throughout the balanced array.*

Lubbers discloses a system that reorganizes a RAID-4 or RAID-5 setup (parity) with a failed disk into a RAID-0 setup (no parity) by replacing the original parity blocks with reconstructed data of the failed disk until the failed disk has been fixed. Once the

failed disk is brought back online, the data kept in the original parity blocks is returned to the repaired disk, and the original parity blocks are used for parity, so that the system becomes a RAID-4 or 5 system again.

Applicant respectfully urges that Lubbers does not show Applicant's claimed novel *"combining a plurality of unbalanced stripe arrays to form the balanced array*, and *distributing assignment of storage devices to parity groups throughout the balanced array."*

Applicant's claimed invention is directed toward declustering the parity of a parity array. Applicant combines unbalanced stripe arrays (arrays where the storage devices contain unequal quantities of blocks for either data or parity) to form a single balanced "super-stripe" array. Applicant then distributes different parity groups to the storage devices throughout the balanced array. By doing this, the parity of the disks is declustered, in that should a storage device fail, reconstruction data is read from portions of each storage device in the balanced array, as opposed to reading all of the data in a cluster of storage devices. Lubbers does not address declustering parity in any way, but instead only converts parity blocks to data blocks when a disk fails in a RAID-4 or 5 system. In fact, to repair the failed disk, the system in Lubbers, as in any standard RAID-4 or 5 system, would have to read all the data from all of the disks in the array to reconstruct the failed disk.

Applicant respectfully urges that the Lubbers patent is legally precluded from anticipating the claimed invention under 35 U.S.C. §102 because of the absence from the Lubbers patent of Applicant's *"combining a plurality of unbalanced stripe arrays to form the balanced array*, and *distributing assignment of storage devices to parity groups throughout the balanced array."*

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At paragraph 2 of the Office Action, claims 10-12, 14, 17-18, and 20-21 were rejected under 35 U.S.C. §103(a) as being unpatentable over Lubbers in view of Wilkes et al., U.S. Patent No. 5,720,025 issued on February 17, 1998, hereinafter Wilkes.

The present invention, as set forth in representative claim 10, comprises in part:

A system that enables parity declustering in a balanced parity array of a storage system, the system comprising:

a plurality of storage devices, each storage device divided into blocks that are further organized into stripes, wherein each stripe contains data and parity blocks from each of the devices of the balanced array;

a storage operating system including *a storage layer configured to implement a parity assignment technique that distributes assignment of devices to parity groups throughout the balanced array* such that all storage devices contain the same amount of data or parity information; and

a processing element configured to execute the operating system to thereby invoke storage access operations to and from the balanced array in accordance with the concentrated parity technique.

Wilkes discloses a RAID parity system that defers updating the parity blocks until the disk array is idle. Wilkes relaxes the coherency between the stored data blocks and the corresponding parity blocks in order to reduce access time to update the data blocks. The system then waits for a time when the disks are not performing substantial tasks before updating the parity blocks.

Applicant respectfully urges that neither the Lubbers nor Wilkes patents show Applicant's claimed novel *"storage layer configured to implement a parity assignment*

*technique that distributes assignment of devices to parity groups throughout the balanced array.*"

Applicant's claimed invention is directed toward declustering the parity of a parity array, as described above, including the use of parity groups. Lubbers, again, does not address declustering parity in any way. Wilkes also does not address declustering parity, and is only a system that delays the updating of a parity block until the disk is idle.

Applicant respectfully urges that the Lubbers patent and the Wilkes patent, either taken singly or taken in any combination are legally insufficient to render the presently claimed invention obvious under 35 U.S.C. §103 because of the absence in each of the cited patents of Applicant's claimed novel "*combining a plurality of unbalanced stripe arrays to form the balanced array*, and *distributing assignment of storage devices to parity groups throughout the balanced array.*"
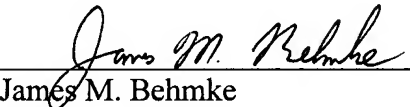
All independent claims are believed to be in condition for allowance.

All dependent claims are believed to be dependent from allowable independent claims, and therefore in condition for allowance.

Favorable action is respectfully solicited.

Please charge any additional fee occasioned by this paper to our Deposit Account No. 03-1237.

Respectfully submitted,

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